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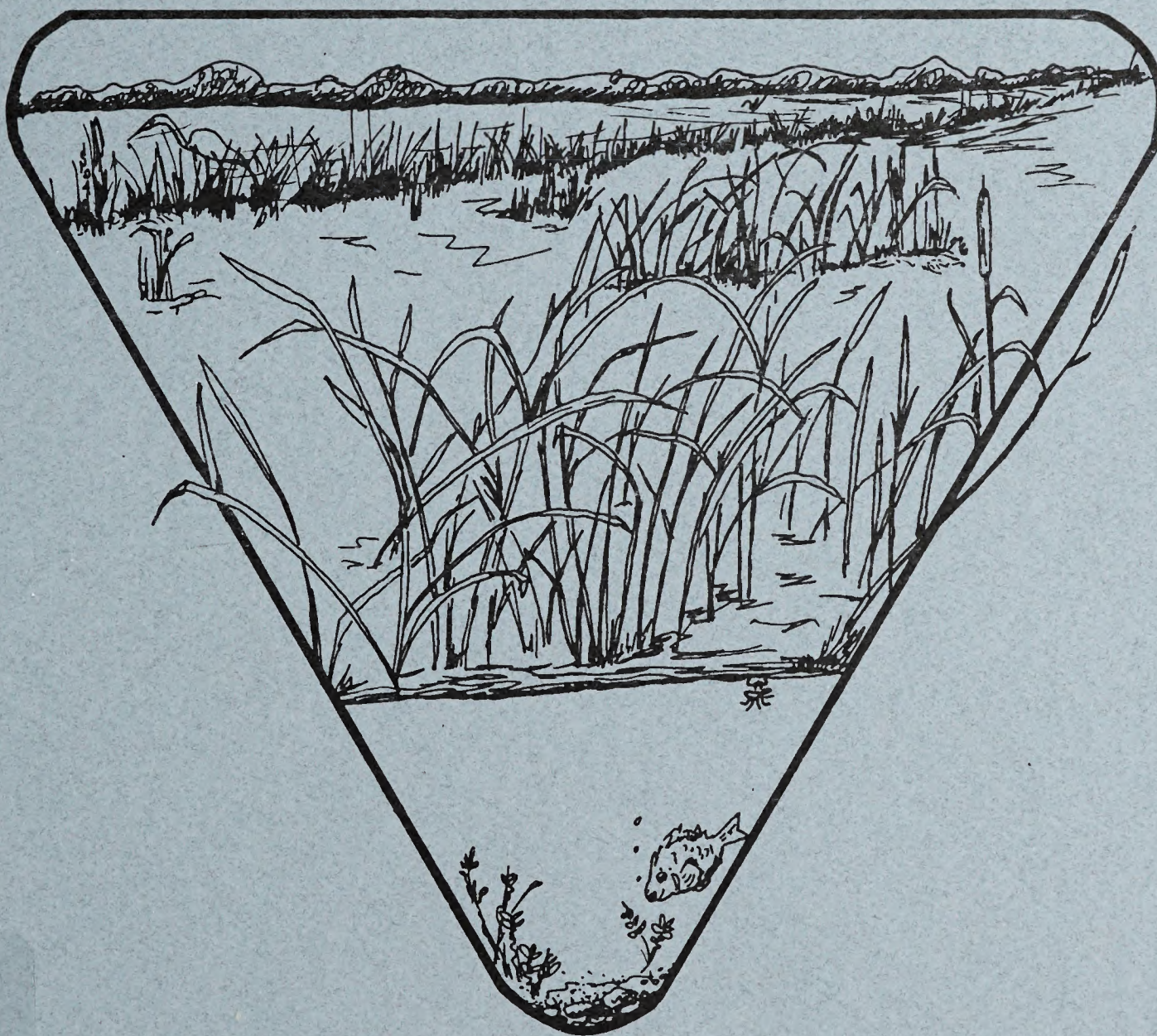


U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

January 1995



Aquatic Ecosystem Strategy



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for California and Northwest Nevada

AQUATIC ECOSYSTEM MANAGEMENT

Aquatic Ecosystem Strategy for California and Northwest Nevada

Public Lands Managed by U.S. Department of the Interior

Bureau of Land Management

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT

California State Office
2800 Cottage Way, Room E-2845
Sacramento, California 95825-1889

IN REPLY REFER TO:

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Dear Friends:

In 1989 the *California Fish and Wildlife 2000 Plan* set a new vision for fish habitat conservation on public lands in California and Northwestern Nevada managed by the Bureau of Land Management. The Plan recognizes that efforts to achieve fish habitat objectives go far beyond the public land boundaries and will require partnerships of public and private organizations from a wide spectrum of the populace. The Plan also recognizes that single management actions like land acquisition cannot achieve improved habitat or population objectives. New long-term approaches are required to permanently change land use practices that impact fish habitats.

This aquatic strategy updates, refines, and expands the fisheries and riparian goals in the *Fish and Wildlife 2000 Plan*. The major thrust of this strategy is ecosystem restoration and management. This is the most effective and long lasting approach to restoring fish populations and habitat; moreover, it provides the maximum benefit to other species. As a signatory to the Memorandum of Understanding on California's Strategy to Conserve Biological Diversity (1991), we now have the opportunity to develop comprehensive cooperative environmental conservation programs. This agreement was expanded to include county supervisorial groups in October 1992. The participation of county supervisorial groups will help insure involvement of local government, citizens and businesses in managing California's natural resources.

The purpose of this strategy is to identify opportunities and actions required to facilitate the following five management steps: (1) involve all parties; (2) adopt regional ecosystem management principles; (3) let best science provide the foundation for decisions; (4) adopt ecosystem health as the primary land management goal; (5) commit to long-term restoration. It will also improve and promote recreational and other uses of fisheries resources. This document renews and expands the commitment of the Bureau of Land Management to help restore fisheries habitat in California and Northwestern Nevada.

Sincerely,

Ed Hastey
State Director

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Aquatic Ecosystem Strategy for California and Northwest Nevada

Errata

page 5 fish species list referenced in first paragraph was deleted in order to shorten document.

last word (survival) in proper functioning definition was omitted.

last word (degradation) in functional at risk definition was omitted.

page 7 Appendix D referenced in first paragraph second column was deleted in order to shorten document.

page 9 Map label Map 1/Figure 1 was omitted.

page 10 Reference to project costs should be page 27 not page 28.

page 17 Reference to Goal 1 should be page 11 not page 8.

page 26 Last paragraph references a strategies-cost Table 10, however, it should reference Table 2 page 27.

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Executive Summary

The Bureau of Land Management (BLM) manages 18.7 million acres of public lands in California and Northwest Nevada, including 3,500 miles of streams and 50,000 acres of lakes and reservoirs inhabited by fish. Native aquatic resources are essential to the biological integrity of the ecosystems in which they occur. Moreover, recreational activities focusing on California statewide fisheries generate a direct expenditure of approximately \$1.8 billion annually.

BLM's *Fish and Wildlife 2000 - A Plan for the Future* established national goals and objectives for managing fish, wildlife, and plant resources. This BLM Fisheries Habitat Strategy identifies goals and strategies needed for managing the biological integrity of aquatic ecosystems and associated watersheds in California and Northwest Nevada. This strategy complements other *Fish and Wildlife 2000* plans, such as *Anadromous Fish Habitat Management*, *Resident Fish Habitat Management* and *Special Status Fishes Habitat Management*, by providing the final component of fisheries resource management. This plan also complements the joint U.S. Forest Service-BLM *Recreational Fisheries Policy* and the BLM *Riparian-Wetland Initiative for the 1990's*.

This strategy is designed to be phased into and coordinated with the *Presidents' Northwest Forest Plan*, *PACFISH Strategy*, *Proposed Rangeland Reform Policy*, and the *California's Coordinated Regional Strategy To Conserve Biological Diversity Memorandum of Understanding* (see Appendix A) to achieve ecosystem management for federal lands. One of the major purposes of these reports and policies is to provide riparian and stream habitat

conditions that contribute to the conservation and restoration of naturally reproducing stocks of fish. They focus on maintaining and restoring ecological functions and processes that operate in watersheds to create good aquatic habitat.

This strategy identifies nine goals necessary to ensure that viable populations of fish and the benefits they provide are maintained. These goals are summarized below:

1. Promote Fisheries, Aquatic, and Riparian Resources in Regional Planning.
2. Manage on a Watershed-level Ecosystem Basis.
3. Adopt Ecosystem Health as the Primary Management Goal.
4. Make Commitments to Long-term Restoration.
5. Let Best Science Provide Foundation for Decisions.
6. Involve All People and Interest Groups and Increase Ecosystem Education.
7. Promote Recreational and Other Uses of Fisheries Resources.
8. Improve Manageability of Important Aquatic Habitat.
9. Ensure Adequate Personnel and Funding to Carry Out this Strategy.

This strategy outlines specific actions to help manage for the biological integrity of aquatic ecosystems and associated watersheds for the benefit of riparian habitat and fishery resources and to manage aquatic ecosystems and associated watersheds to provide for social and economic benefits and recreational uses by the public.

Introduction

Nearly 10 million people observe, harvest, photograph, and otherwise appreciate fish in California and Northwest Nevada. Recreational activities focusing on California fisheries generated a direct expenditure of \$1.8 billion in 1991. For purposes of this strategy, "fish" refers to all species of fish that occur in California and NW Nevada including non-native species, such as largemouth bass and bluegill.

Fish and their habitats are important not only for their aesthetic and economic values, but also because they constitute a part of California's and Nevada's highly valued natural heritage. Some think that fish are an isolated component of stream and lake communities. Fish are not an isolated component of any ecosystem. The factors adversely affecting fish in California are eroding the biological diversity of entire ecosystems. Similarly, goals under this strategy cannot be achieved without rehabilitation of the ecosystems upon which fish depend.

Healthy streams and lakes and their associated wetland habitats are among the world's most biologically diverse and highly productive environments. The land-water interface promotes complex associations of animals and plants, ranging from microscopic plant species to vegetation communities that sustain invertebrates, fish, amphibians, reptiles, birds and mammals. These habitats also play a role in purification of water supplies, moderating regional impacts of flooding, and collect rain and snow runoff, thus replenishing water supplies needed to sustain natural vegetation, agriculture crops, and other species, including humans.

Economic development of California and Nevada has brought many changes to fish populations and the habitats that support them. Large-scale alterations of watersheds by dam construction, timber harvest, agriculture, and urbanization have affected the distribution and abundance of numerous fish species. Water projects built in California have not treated fish habitat very well, relying on hatcheries instead of healthy ecosystems to sustain fish populations. Salmon have been particularly impacted by dam building, many native salmon stocks are now at risk. Some are in danger of going extinct, such as the San Joaquin River fall run chinook.

Early concern for fish in California focused on the need to maintain stream habitat by banning hydraulic mining in 1884. We are still trying to maintain or enhance fish habitat in the 1990s. However, we are now taking the following five critical steps to improve management of fish habitat on public lands managed by BLM in California and NW Nevada:

- * Involve all interested and affected parties in all phases of watershed or ecosystem management.
- * Adopt regional ecosystem management principles.
- * Adopt ecosystem health as the primary land management goal.
- * Let best science provide the foundation for decisions.
- * Commit to long-term restoration.

The purpose of this strategy for improving aquatic ecosystems is to identify resource opportunities and actions required to

implement these five management steps. This strategy also identifies opportunities to accomplish many objectives outlined in BLM's *Fish and Wildlife 2000 Fisheries Strategies*, *The President's Northwest Forest Plan*, *PACFISH Strategy*, *Restoring Central Valley Streams: A Plan For Action*, and many other federal, state, or local strategies that include aquatic/fisheries/riparian actions.

BLM's *Fish and Wildlife 2000* plan identifies three national fisheries plans that address issues pertaining to aquatic ecosystems. These published plans are the *Anadromous Fish Habitat Management*, *Special Status Fishes Habitat Management*, and *Resident Fish Habitat Management* plans. This strategy document communicates BLM's national strategy for managing aquatic ecosystems to the state level.

The *President's Northwest Forest Plan* adopts coordinated ecosystem management direction for federal lands. This plan also calls for watershed analyses to identify the fundamental forms and functions that contribute to healthy watersheds. We propose to adopt both the coordinated ecosystem management direction and watershed analysis processes as described in these strategies.

The *PACFISH Strategy* is a strategy to provide conditions that contribute to the conservation and restoration of naturally reproducing stocks of Pacific salmon and anadromous trout on federal lands. Its' focus is on maintaining and restoring ecological functions and processes that operate in a watershed to create good fish habitat. This strategy adopts the *PACFISH* watershed management approach.

The *Restoring Central Valley Streams* action plan provides guidance regarding actions needed to achieve habitat restoration for various aquatic species in the Central

Valley upstream of the Sacramento-San Joaquin Delta. This strategy adopts those actions and commits BLM to be a cooperator to help achieve the objectives in the Central Valley Plan.

In California, the BLM, other federal and state agencies, and county governments signed a Memorandum of Understanding to conserve biological diversity. This 1991 agreement and the *Statement of Intent to Support the Agreement on Biological Diversity* signed by California Counties in 1993 is designed to conserve California's biological resources and maintain the state's social and economic viability. The approach to ecosystem conservation under the agreement has attracted many diversified interests, thereby broadening the opportunity to achieve success.

This plan has an initial 10-year horizon through the year 2004. It is a comprehensive document that needs constant review and update to remain viable and to effectively deal with regional ecosystem problems. Successive updates are planned at three-year intervals.

Documentation for the fisheries recreation and economic information in this introduction can be found in U.S. Department of the Interior and U.S. Department of Commerce, Bureau of the Census, 1991 National Survey of Fishing-Hunting-Associated Recreation, Gov. Print, Washington DC 1993.

COMMON FISHERIES PLAN PHILOSOPHIES

Many plans and strategies have been developed by federal, state and local agencies, and conservation groups which contain California and Nevada fisheries management and habitat conservation measures. The following are philosophies and guidelines which are common to all of these plans written within the last three years.

- * Conservation takes precedence over any other use of the fisheries habitat resource.
- * The maintenance of abundant fisheries populations is dependent on the long-term protection, restoration, and management of habitat at a regional ecosystem level.
- * The persistent loss of fisheries key habitat and associated wetlands throughout California must be reversed.
- * Protection of fish and their habitats in California requires long-term programs and the close cooperation and coordination of management activities by private groups, local government, state government, and federal government.
- * Joint ventures of private and government organizations should be the primary vehicle for implementing basin wide projects.
- * Both population and habitat objectives for fish should be met through long-term actions that maintain other ecological values and promote biological diversity.
- * There are "no quick fixes." Contemporary habitat conservation actions that try to counter 150 years of habitat degradation will take time to result in significant population responses.

BLM's focus is on cooperatively maintaining and restoring ecological functions and processes that operate in a watershed to create good fish habitat; therefore, this strategy is consistent with the above philosophies.

GENERAL FISH HABITAT STATUS
BLM MANAGED PUBLIC LANDS IN THE BLM CALIFORNIA REGIONS

The BLM California Regions comprise one of the most habitat-diverse places on earth. This diversity is well represented in the 3,500 miles of streams and the 50,000 acres of lake and pond surface administered by BLM. These aquatic systems range from the arid expanse of the southern California desert, north beyond the snow-capped Sierra Nevada, and west to the Pacific Coast (Figure 1), and include the northwest corner of Nevada. (See Appendix A for fish species list by program; special status, recreational fisheries, or other.)

California has 132 identified fish species in its waters (Moyle 1975). Of the 116 native species and subspecies (Moyle 1991), 67 are endemic to California (Moyle et al. 1989; Moyle pers. commun. [10/8/92]). The Nevada waters within the Region contain 8 native species, two of which are endemic to Nevada. Ten native species are Federally listed as threatened or endangered, and an additional eight are identified in the BLM *Special Status Fishes Habitat Management* plan. Of the remaining 98 native species, 35 are identified as California Fish Species of Special Concern (Moyle et al. 1989). With over 50 percent of the native species either at risk of extinction or in decline (Moyle pers. commun.), much focus is being placed on maintaining the native fish diversity. Although there are few pristine aquatic systems remaining, there are several with intact native fish communities that are managed by BLM in California.

The amount of scientific data and history of BLM managed fish habitat varies greatly by location. Some areas (e.g. Mattole River Estuary) have long-term research conducted within the area. However, in other areas

information is lacking. The most basic information available on fish habitat and its associated riparian vegetation is **Functioning Condition**. There are four categories of functioning condition: (1) proper functioning, (2) functional at risk, (3) non functional, and (4) unknown. Detailed definitions of these categories are available in BLM's Technical Reference 1737-7. Condensed definitions as they relate to fish habitat follow. The full definition includes physical and biological assessments.

Proper Functioning: adequate characteristics to provide the habitat necessary for fish production and

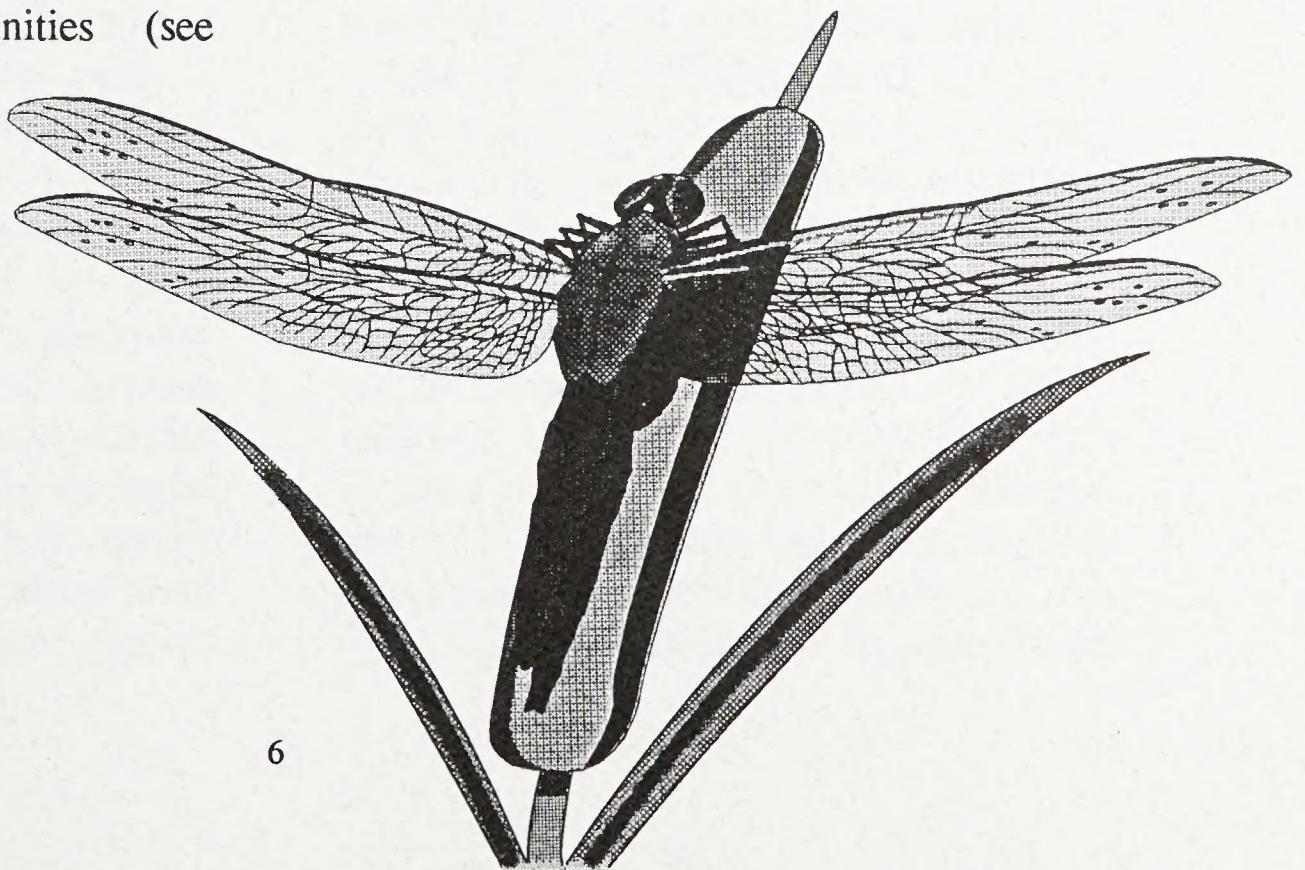
Functional At Risk: functional condition, however, an existing attribute makes it susceptible to

Non Functional: clearly does not provide characteristics necessary for fish production and survival.

Unknown: areas with insufficient information on which to make any form of determination.

1993 Stream/Riparian Condition Data
380 miles Properly Functioning
420 miles Functional At Risk
110 miles Non Functional
2590 miles Unknown

In general, inventories and evaluations on fish habitat need to be updated. More studies on the habitat requirements for species need to be conducted to develop sound management plans. Additional work on the taxonomy of many of the species is also needed to ensure that management plans fully address preservation of biodiversity. Because of the multitude of systems with mixed land ownership, emphasis will be placed on ecosystem management plans based on watershed-level analysis. These plans will be integrated and coordinated with Coordinated Resource Management Plans (CRMPs) to ensure healthy and properly functioning aquatic ecosystems. In addition to managing for native fish, with the dense population centers located in California, management will begin looking at more recreational fishing opportunities (see Appendix B).



CURRENT MANAGEMENT

The management of fish habitat and its associated wetland habitat is a growing program for the BLM in California. Within the past four years the number of fisheries staff assigned to the program has increased from one to five. The overall completion of field projects by this group is relatively minor compared to other BLM programs. However, significant progress is being made toward proper aquatic habitat management. For example, an interdisciplinary team of the Susanville District has developed a *Wetlands, Riparian, and Aquatic Program* (WRAP). This program details management direction for 200 miles of perennial streams, 4,000 miles of intermittent streams, and 37,000 lake and reservoir acres. The California Desert District staff have completed and are implementing a Special Status Fish Strategy.

Despite these achievements, fisheries habitat management can be significantly improved. Perhaps most in need of additional effort is the inventory and monitoring of aquatic systems and their associated watersheds. We know the basic condition status of only approximately 26 percent of the fisheries stream habitat.

In 1992, the BLM developed Memoranda of Understanding (MOU) with California Trout and Trout Unlimited. These MOUs have already served as tools for developing several cooperative fisheries projects. At present, three BLM California *Bring Back the Natives* projects are sponsored by Trout Unlimited.

BLM's stewardship encompasses all but three of California's 58 counties, and also includes an additional 1.5 million acres in northwestern Nevada (see Map 1). This vast area is managed by 15 Resource Areas under the direction of four District Offices.

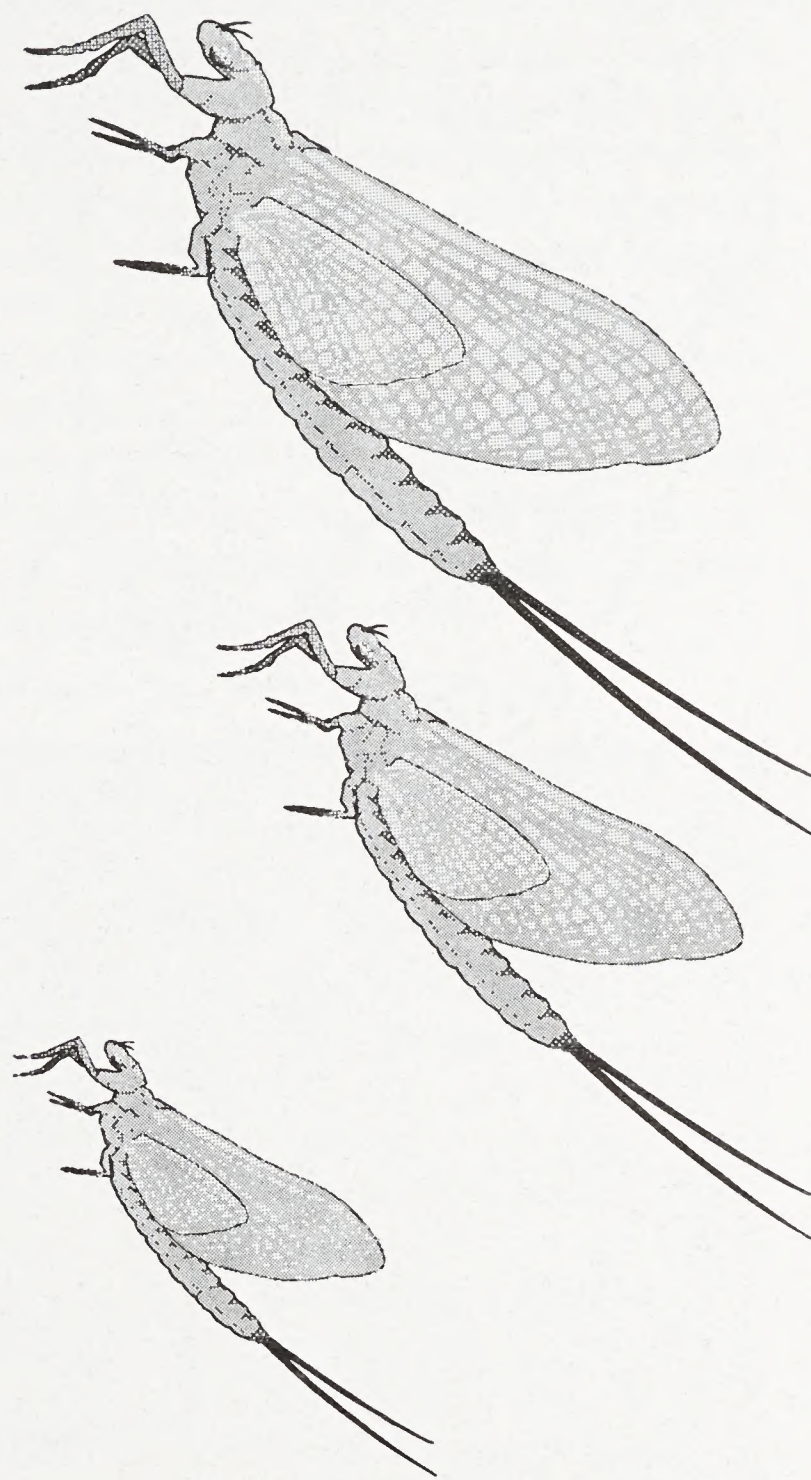
The Ukiah District manages over 200 miles of fish habitat that is very important to conserving many of the "at risk" fish stocks. For example, the fall chinook run on the Shasta River (Klamath River Basin) is considered at a high risk of extinction, and BLM manages a significant portion of the available critical spawning area. The Ukiah District is focusing their project work on watershed restoration (e.g. road rehab, riparian planting, erosion control, etc.). Appendix D contains a summary of many important and urgent Ukiah District watershed restoration projects which are in need of funding.

The Susanville District manages habitat for 17 special status fishes and five other special status species that depend on aquatic habitats. A major management focus in this District is to prevent extinction and promote recovery of these species. As identified in the District WRAP strategy, emphasis will be on watershed-level integrated management planning to address aquatic habitat. This District has the potential to manage approximately 300,000 acres of wetland habitat, 37,000 acres of lake and reservoir habitat and over 200 miles of perennial stream habitat.

The aquatic resources within the Bakersfield District are primarily found in the major river drainages on the west slope of the Sierra Nevada, the base of the east scarp of the Sierra Nevada, and the headwaters of the East Walker River drainage in the great basin. On the Sierra Nevada west slope, BLM lands occupy the lower stream elevations below the National Forest lands from the Yuba River in the north to the Kern River in the South. In the Owens Valley, BLM streams lie on the

alluvial fans between the National Forest of the Sierra Nevada and the Owens Valley floor. In the East Walker watersheds, BLM lands occupy the head waters above the private land valley bottoms. The fishery resources on BLM in these watersheds are a combination of native salmonid stocks, put and take trout hatchery stocks, and low elevation warm water fisheries. Four federally listed fish species (Owens pupfish, Owens tui chub and Lahontan cutthroat trout) occur on BLM lands at several locations east of the Sierra Nevada range in the Owens Valley. These watershed also contain aquatic habitat that supports other species of special concern such as; aquatic snails, fairy shrimp, California tiger salamander, California red-legged frog, foothill yellow-legged frog, western pond turtle, and two-lined garter snake.

The California Desert District manages only four fish species; however, all four are special status fishes. The Mohave tui chub is native to the Mojave River drainage and is both a Federal and state-listed endangered species. The desert pupfish is found in the Sonoran Desert of California and is also a Federal and state-listed species. The Amargosa Canyon pupfish and Amargosa River speckled dace are restricted to the Amargosa River and its tributaries around Tecopa. Both are listed as BLM-sensitive species. Since the management actions needed to prevent extinction of these fishes are so complex, a separate strategy document has been developed. All of the goals contained in this aquatic ecosystem strategy apply to management actions in the California Desert District. The name of the Desert District strategy is *Special Status Fishes Strategy for California Desert District*.



United States
Department of the Interior

Bureau of Land Management
California BLM Jurisdictions

BLM-California Public Land Acreages



County	Acreage	County	Acreage
Alameda	217	Plumas	10,486
Alpine	12,808	Riverside	1,659,772
Amador	9,191	Sacramento	2,019
Butte	18,916	San Benito	98,960
Calaveras	37,787	San Bernardino	7,088,860
Colusa	31,559	San Diego	173,495
Contra Costa	69	San Francisco	0
Del Norte	195	San Joaquin	436
El Dorado	14,633	San Luis Obispo	239,263
Fresno	134,264	San Mateo	0
Glenn	11,173	Santa Barbara	7,702
Humboldt	63,227	Santa Clara	4,930
Imperial	1,190,548	Santa Cruz	12
Inyo	2,890,640	Shasta	120,739
Kern	722,076	Sierra	5,336
Kings	10,375	Siskiyou	99,057
Lake	122,763	Solano	2,157
Lassen	1,009,488	Sonoma	7,281
Los Angeles	13,647	Stanislaus	3,626
Madera	3,089	Sutter	2
Marin	0	Tehama	49,803
Mariposa	72,159	Trinity	82,494
Mendocino	117,100	Tulare	118,753
Merced	5,865	Tuolumne	44,959
Modoc	272,230	Ventura	1,929
Mono	555,095	Yolo	28,060
Monterey	35,310	Yuba	1,868
Napa	31,197		
Nevada	19,456		
Orange	1		
Placer	20,668		

CALIFORNIA TOTAL: 17,256,745

NEVADA-
Acreage managed by BLM-California






HUMBOLDT 18,706

WASHOE 1,433,475

NEVADA TOTAL 1,452,181

BLM-CALIFORNIA TOTAL 18,708,926

LEGEND

-  PUBLIC LANDS
-  DISTRICT BOUNDARIES
-  RESOURCE AREA BOUNDARIES
-  STATE OFFICE
-  DISTRICT OFFICES

Management Strategies for the Future

This section establishes goals and outlines opportunities/strategies for managing BLM's aquatic and associated wetland habitat in California and NW Nevada between now and the year 2004. These strategies generally call for a far higher priority on protection of healthy aquatic ecosystems because conservation is far less expensive in the long-term than restoration. Another common thread that runs through all strategies is partnerships between government, non-profit groups, and the private sector. In order to be effective, aquatic ecosystem management must be carried out across ownership and political boundaries.

Separate sections providing project costs for implementing many of these strategies are given on page 28 of this strategy. The identified accomplishments and estimates of costs were provided by BLM field offices in California. The proposed accomplishments and dollar estimates are based on the best information available at the time this document was prepared. All dollar estimates are expressed in terms of 1993 dollars. True costs may increase as additional habitat condition data are collected. However, it is also possible that costs for watershed restoration and protection may decrease with the implementation of regional ecosystem management.

Biodiversity & Regional Ecosystem Management

Biodiversity is the variety of life and all that sustains life. At the community level, it includes the variety of species and the genetic variety within species found within a particular habitat, such as a stream. At the ecosystem level, it includes the variety of communities, the physical attributes (water, soil, etc.) and the processes that affect them. At the regional ecosystem level, biodiversity is the combination of the variety of ecosystems found within a geographic area, such as a river basin. Management goals at a regional ecosystem level are characterized by a compatible level of economic productivity, a high level of biodiversity (full array of native species), and jurisdictions and ownerships working together to achieve common goals and objectives.

Each species has its own importance, and maintaining the full array of species provides many benefits for humanity. For example, the cancer-fighting Pacific yew tree has great medical significance for humans. Biodiversity is also important because it has intrinsic value; it supports the integrity and resilience of ecosystems on which numerous species, including humans, depend; it provides the genetic variation and distribution of that variation necessary for the continued evolution

Goal 1. BLM will be Active in Promoting Fisheries and Aquatic Resources in Regional Planning for Biological Diversity

As more public agencies, private individuals and private organizations have become aware of the need to balance the conservation of biological diversity with the need for maintaining social and economic viability, efforts to coordinate management at a regional scale have begun. One of the most important management coordination efforts took place in 1993-California Counties signing the *Statement of Intent To Support The Agreement On Biological Diversity*.

A major segment of any regional ecosystem planning effort is to conserve the full array of species collectively instead of each species individually. Fisheries and other aquatic resources are part of that array. Of concern for BLM California is the conservation of 31 special status fish and other aquatic species in California and northwest Nevada in order to retain the ability to have a complete fauna for a region. In addition, because regions have already begun to lose species or experience adverse changes in communities because of introductions of exotic species, other areas of high concern are those with a high level of biological integrity, including intact or nearly intact native aquatic assemblages.

The habitats of special status aquatic species and the distribution of aquatic assemblages extend beyond single streams and across jurisdictional boundaries. Therefore, a bioregional coordinated approach is necessary. For the fish and

aquatic resources, bioregions based on the aquatic provinces provide a starting point for discussion of bioregional planning (see Table 1).

Because fish and aquatic resources require a bioregional approach, BLM management the fish and aquatic resources will need to include active participation in bioregional planning and the steady promotion of fish and aquatic resources in bioregional planning efforts.

Strategies

Evaluate fish and aquatic communities at the aquatic province level to identify management priorities for maintaining the biodiversity of fish and aquatic resources.

- Coordinate with public and private agencies, organizations, and individuals who may have information about the distribution of fish and aquatic resources in California and northwest Nevada and further refine the boundaries of aquatic provinces if necessary.
- Hold workshops and meetings to bring agencies and researchers together to prioritize areas to manage for fish and aquatic resources, giving special consideration to areas with aquatic species or communities at risk, unique or rare assemblages, and intact or nearly intact native aquatic assemblages.

- Participate with the California Department of Fish and Game and the University of California in developing the *Aquatic Diversity Management Area Program*, a classification and prioritization procedure for aquatic resources.
- Continue to participate in the interagency California Rivers Assessment, an aquatic information system for planning and decision-making.
- Promote the inclusion of information for the aquatic provinces that extend into northwest Nevada, south and southcentral Oregon, and southwest Arizona and encourage the participation by agencies responsible for those areas.
- Coordinate with agencies, local governments, private individuals and private interest groups to identify consumptive and non-consumptive values of fish and aquatic resources to assist in the regional prioritization of management for these resources.
- Employ GIS technology for regional data analysis of the fish and aquatic resources.

Support and promote bioregional planning as a necessary step to improving management of fish and aquatic resources, and integrate fish and aquatic resources into bioregional planning efforts.

- Coordinate with other agencies, local governments, private individuals and private interest groups to present the fish and aquatic resources information and prioritization within aquatic provinces to the California Biodiversity Executive

Council and Bioregional Councils, established in the California "Agreement on Biological Diversity."

- Participate fully in bioregional planning meetings and ensure that management of fish and other aquatic resources are given due consideration.
- If bioregional meetings are not being held for bioregions with areas of high concern and priority based on the fish and aquatic resources, take the initiative in hosting workshops and meetings to begin bioregional planning and assert its importance to the fish and aquatic resources.
- Use bioregional planning workshops and meetings as a forum to select at least one pilot watershed within each aquatic province to implement the analysis in *Watershed Analysis: A Procedural Guide* (see Goal 2), and advocate that the bases for selection: 1) include the coordinated prioritization of areas for fish and aquatic resources management based primarily on concerns for special status fish and aquatic species and unique or intact native aquatic assemblages and secondarily on the ability of the watershed to provide a system of refugia for the resources; 2) at least initial agreement that recovery and restoration is possible; and 3) there is potential for participation of all of the necessary agencies, private landowners, local governments, and private interests in the analysis.
- Actively promote the needs of fish and aquatic resources management to other government agencies, private land users,

private landowners, conservation organizations, and interested publics to broaden support for bioregional planning efforts.

Ecosystem Health

Ecosystem health can be defined with many of the same concepts that apply to human health. For example, a person's health can be described by his or her ability to grow, strength and resiliency, and resistance to disease. Healthy watersheds are more productive, more resilient, and can bounce back more quickly after natural disturbances such as floods, drought, or fire. Too much human-induced stress from road building or other activities, however, reduces their capacity to recover from such disturbances.

Table 1. Suggested bioregions based on general zoogeography of native fish species and major drainage system from *Inland Fishes of California* (Moyle 1976) and the California BLM Resource Areas within these aquatic provinces.

AQUATIC PROVINCES	CALIFORNIA BLM RESOURCE AREAS
<i>Klamath</i> - Klamath River - Rogue River	Alturas, Redding Redding
<i>Sacramento - San Joaquin</i> - Goose Lake - Pit River - Central Valley - North Coast Streams - Clear Lake - Pajaro - Salinas - Kern River	Alturas Alturas, Redding, Eagle Lake Redding, Eagle Lake, Folsom Arcata Clear Lake Hollister Caliente
<i>Lahontan</i> - West Lahontan - Surprise Valley - Warner Valley	Surprise, Eagle Lake, Bishop Surprise Surprise
<i>Death Valley</i> - Mono Lake - Owens River - Amargosa River - Mojave River	Bishop Bishop Barstow, Ridgecrest Barstow, Needles, Ridgecrest
<i>Southern California</i> - San Diego - Los Angeles Basin - Santa Maria - Santa Inez - Coastal	Palm Springs-South Coast Palm Springs-South Coast Palm Springs-South Coast Palm Springs-South Coast
<i>Colorado</i> - Salton Sea - Colorado River	El Centro, Palm Springs-South Coast El Centro, Palm-Springs-South Coast, Needles

Goal 2. Manage on a Watershed-level Ecosystem Basis.

BLM management for fisheries has traditionally focused on single species rather than on aquatic communities, and past management plans have primarily focused on portions of rivers or shorelines within BLM jurisdiction. Scientists and managers are becoming increasingly aware that addressing individual species or individual pieces of habitats is no longer adequate for successful management of fish and other aquatic resources.

Successful management of fish and aquatic resources requires a watershed-level ecosystem approach that incorporates all features of a watershed that affect the aquatic ecosystems. This includes evaluating all management activities and natural processes within the watershed that can affect the interactions among the physical, chemical, and biological components of the aquatic ecosystem. Traditional boundaries need to be transcended because of the ability of water to carry effects across those boundaries. Possible future consumptive and non-consumptive uses of the natural resources in a watershed also need to be assessed in developing a watershed-level management plan to ensure long-term benefits for the fish and aquatic resources.

Strategies

Following the prioritization for watershed analysis from the bioregional planning discussions (see Goal 1), implement the procedures in *Watershed Analysis: A Procedural Guide* to develop and document a scientifically based understanding of the

processes and interactions within a watershed, to focus on issues, values, and uses within the watershed, and to provide a basis for making sound management decisions. This watershed analysis guide is embodied in the *President's Northwest Forest Plan* and the *PACFISH Strategy* in order to help document a scientifically based understanding of the interactions occurring within a watershed. As the *Watershed Analysis* pertains to fish and aquatic resources, the following strategies should be followed:

- Use information generated in coordinated efforts in the analysis for bioregional and aquatic province prioritization (see Goal 1).
- Using an interdisciplinary team of qualified professionals, coordination with other agencies and private organizations, collect and analyze inventory and monitoring data on fish and aquatic resources to supplement existing information and to identify all fish and aquatic assemblages and their interactions with the other physical, chemical, and biological components of the watershed.
- With interdisciplinary participation, compare the current aquatic and riparian conditions with their historic state.
- Through coordination efforts and using the information from bioregional discussions, identify beneficial consumptive and non-consumptive uses of fish and other aquatic resources.

- In coordination with other stakeholders, identify the desired condition for the fish and aquatic resources, strongly promoting the recovery and conservation of special status fish and aquatic species, the restoration and conservation of unique and intact native aquatic assemblages, and other beneficial uses that do not conflict with conservation efforts.
- With interdisciplinary team support, determine the overall ability of the watershed to support the desired condition of the fish and aquatic resources and define the objectives for fish and aquatic resources if needed.
- Through interdisciplinary and expert involvement, identify the management activities and natural processes that are preventing the desired objectives for the fish and aquatic resources from being met.
- With an interdisciplinary team of experts, develop management recommendations for achieving the desired objectives for the fish and aquatic resources.
- Develop specific monitoring objectives for fish and aquatic resources for a monitoring plan that includes actions to be taken if objectives are not being met.
- Adopt the recommendations from the Watershed Analysis into management plans to which BLM is a signator.

Planning for any management activity that has the potential to affect fish or aquatic resources should include some form of watershed-level analysis until a complete

Watershed Analysis can be conducted as described in the *Procedural Guide*.

- Interdisciplinary review for all proposed management activities will require identification of potential effects on fish and aquatic resources.
- If proposed management activities have the potential to affect fish and aquatic resources, an interdisciplinary subwatershed-level analysis, such as Susanville District's Level 4 Watershed Functional Assessment, should be conducted for areas with critical fish and aquatic resource management issues.
- Efforts should be made to develop integrated resource management plans until a complete Watershed Analysis per the *Procedural Guide* can be accomplished.
- If for some reason a complete Watershed Analysis cannot be performed, any extrapolations of information for fish and aquatic resources will be scientifically based and the objectives will include overall health of the aquatic and riparian ecosystem (see Goal 3).



Goal 3. Adopt Ecosystem Health as Primary Management Goal.

Restoring and maintaining ecosystem health should be the primary goal in management of public lands. No single species or single commodity production (e.g. pounds of fish) should drive management. Instead, the processes and functions of the ecosystems that maintain landscape productivity should be featured. In forested areas, for example, this may mean the protection of headwater areas that serve as suppliers of woody debris. In this way, the integrity of the entire communities of organisms can be maintained before the individual species warrant Endangered Species Act protection.

The special status of over 30% of California's native fish taxa indicate that our watersheds are losing their resiliency and productive capacity. As an example, the Bakersfield District reported in 1989 that 45 percent of its riparian habitat and stream channels were in unsatisfactory condition. However, BLM's fishery program capability alone cannot cope with problems of this magnitude. Broad changes are needed to address problems of this scale. Many of these changes are forthcoming with *The President's Northwest Forest Plan*, Range Reform and *PACFISH Strategy* policies. Inventory and monitoring needs must be met if we are to have the data required to measure the health of the ecosystems.

Strategies

- Adopt the buffer zone guidelines from the *President's Northwest Forest Plan* and *PACFISH Strategy* until more site-

refined guidelines are developed through the watershed analysis (see Goal 1 strategies page 8).

- As per Range Reform, develop local strategies and guidelines for riparian habitat and streams that are functional at risk or are non functional.
- Develop processes to assess functioning condition that are based on local habitat attributes. All Districts and or Resource Areas should complete this by October 1994.
- Monitor and evaluate ongoing and proposed management activities to ensure that objectives for fishery resources are being met.
- Ensure that fishery objectives and associated monitoring schedules are developed for all activity plans where fishery resources exist or have the potential to be reestablished.
- Analyze inventory and monitoring data to develop and/or revise planning documents and prioritize actions affecting fishery resources.
- Monitor habitats and populations to determine current status of fishery resources and presence of undesirable species; control, manage and eradicate non-native species as necessary to maintain native fish assemblages.

Goal 4. Commit to Long-term Restoration

Quick fixes to stream degradation are seldom effective over the long-term. It takes much more than stream structures to repair the damage of past decades. A 1983 report by John Hamilton demonstrated an instream structure failure, for structures he built without engineering for hydraulic expertise, that exceeded 85 percent in a northwest California stream. As noted in his report, studies have shown that instream structures could be effective, but only within the constraints imposed by the hydraulic forces of the streams.

A long-term restoration strategy will be effective if we put emphasis on: 1) conservation of remaining properly functioning riparian habitats and streams, and 2) restoration of degraded streams through better management of watersheds.

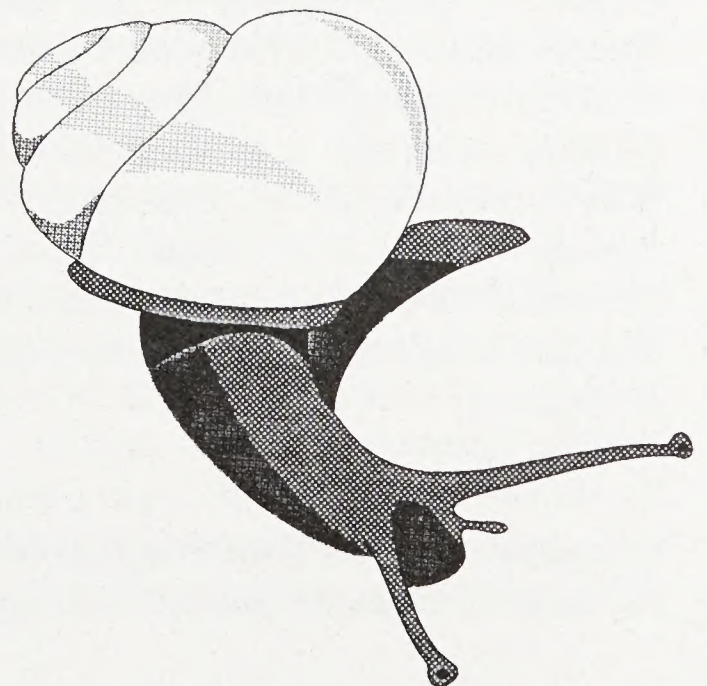
Ideally, an analysis will be conducted in each watershed to determine altered environmental conditions, mechanisms of environmental changes, and determine restoration needs and strategies. The cumulative effects of roads, timber harvest, and other projects, even when implemented according to Best Management Practices often overwhelm the integrity of watersheds. To restore watersheds, all activities must be consistent with the watershed analysis.

Strategies

- Complete watershed analysis as discussed in Goal 2 of this text.
- Implement the Riparian Habitat Conservation Area management policy, from the *President's Northwest Forest*

Plan and PACFISH reports, for all proper functioning riparian habitats and streams or other areas where riparian habitat could be restored to properly functioning condition in watersheds beyond the spotted owl and anadromous fish Resource Areas.

- Review and modify current restoration management objectives to conform to watershed analysis results.
- Make sure restoration actions take an ecosystem perspective and are implemented in the most effective order. For example, make "top" of the watershed a high priority for restoration. Restore the integrity of the habitats in the headwaters and then begin restoration farther downstream in order to reduce cumulative impacts to restoration projects caused by up-stream problems.



Goal 5. Let Best Science Provide the Foundation for Decisions

We often underestimate the importance of understanding the histories of our streams, their natural conditions, and the processes that altered them. However, this information is critical in establishing desired future conditions for improving fisheries habitat health. There is also a lack of information on the life history for some of the fish species we manage.

Historically, a plethora of scientific knowledge has been available to land managers. Often, natural resource decision makers were not aware of such knowledge. In other cases, best science has been ignored or rejected due to political or economic factors. Recently, the Clinton administration has acknowledged that the best available scientifically sound information be placed into the hands of land management decision makers on a timely and continual basis. Best science provides the framework or factual scientific reality from which sound ecosystem management decisions can be made. However, it should not be regarded as simply the final answer to ecosystem management decision making process.

Recently, the Department of the Interior created a new agency - the National Biological Survey. This agency is available to help us increase our understanding of the problems with our watersheds and help us design procedures for their repair. The Survey can also help develop a comprehensive monitoring program that will function across administrative and political boundaries.

Currently, BLM in California has identified 25 fisheries research projects that could be

submitted to the Survey. These research projects include:

Assessing habitat requirements and life histories for native fish.

Evaluating native fish reintroduction.

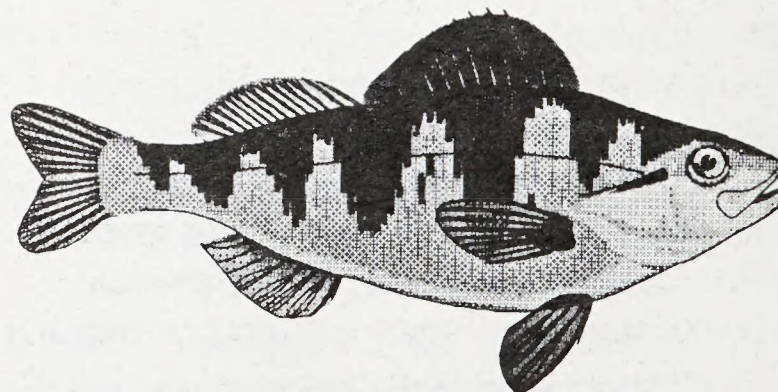
Describing fish and invertebrate communities.

Modeling long-term effects of various land use practices.

Identifying consequences of long-term environmental changes.

Strategies

- Prepare long-term fish research proposals by the end of 1995 and submit them to the National Biological Survey.
- Support coordination of aquatic and riparian habitat research efforts among other federal, state, academic and private researchers.



Goal 6. Involve All People and Interest Groups. And,

Develop public awareness and support for fisheries programs and promote partnerships with other agencies, landowners, interest groups, and individuals.

For ecosystem management to be effective, all landowners within each watershed need to be involved. We must communicate the scientific framework of the ecosystem problems and the resulting loss of biodiversity, water quality problems, increased flood frequency and other negative effects. It is very important that landowners and public land users realize that there are benefits to improved watershed management beyond restoring fish habitat.

The cooperation and involvement of local citizens, landowners, user groups, and conservation groups will be crucial to implementing regional ecosystem management. This requires communication and education efforts on the part of BLM.

An ever-increasing number of people are taking part in activities related to both the consumptive and nonconsumptive use of fishery resources. Recreational, commercial, and subsistence uses of fish and the waters they inhabit continue to rise.

BLM welcomes the multiple uses of fisheries resources on lands it manages. However, BLM realizes that effective management requires cooperation between Bureau programs and the public. Input from individuals, landowners, local governments, interest groups, other federal and state agencies, and academia, is vital to proper fisheries management. Coordinated and responsible management promotes a greater awareness and understanding of Bureau management objectives and willingness of

interest groups and individuals to join with BLM in maintaining healthy fisheries.

Environmental Education

Public concern in environmental matters has led BLM to become involved in environmental education. Much of the educational thrust is directed toward students, user groups, outdoor enthusiasts, and other interested individuals. Private sector partners have helped in this effort by providing funding and developing and making fisheries related activities available to BLM. These activities are shared with school-aged children during National Fishing Week, other outdoor day programs, and the national Adopt-a-Watershed program. There are currently two education projects or plans identified as ongoing among all BLM offices in California.

Outreach Partnerships

BLM has and is developing cooperative partnerships with a variety of public land user groups and individuals as well as private companies. Potential partners include, but are not limited to: conservation groups, the recreational fishing industry, local government, private landowners, the outdoor publication industry, and nonfisheries-oriented commodity groups. These groups aid in managing fishery resources by becoming involved in rehabilitation, enhancement, access, and environmental education projects. Help

comes in many forms including volunteer labor, technical knowledge, printed information, funding, access to land, and project supplies.

BLM recognizes the importance of a strong working relationship in the form of outreach partnerships. A total of 8 partnership projects related to fisheries resources are now in place. Fisheries biologists have identified 60 additional plans/projects that would benefit the fishery resource and the public if implemented.

Promotional Activities

With the increasing demand for outdoor recreation, fisheries biologists, in cooperation with the recreation program and its *Recreation 2000* initiative, are developing strategies to inform visitors of ways to enjoy fishery resources and to showcase projects and techniques used in day-to-day management.

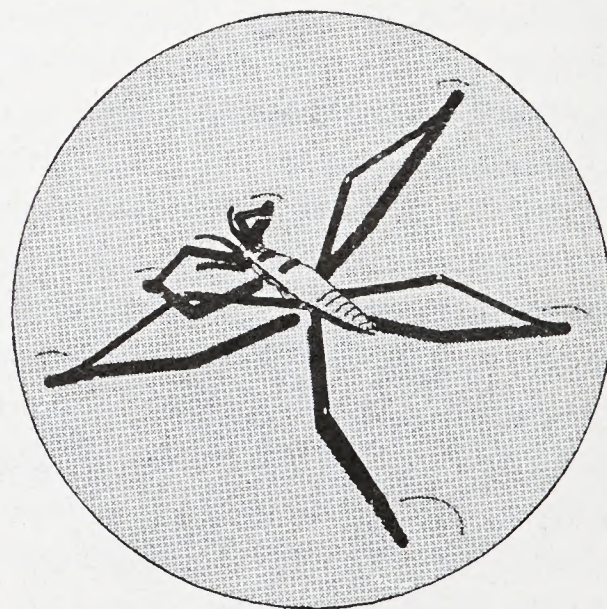
There are 6 BLM-initiated promotional activities currently in operation. Another 45 plans/projects related to promotion are developed, but are not in operation due to funding constraints.

Strategies

- Coordinate management between BLM and other agencies and institutions through formal documents such as Memorandums of Understanding and Cooperative Agreements.
- Expand and continue to implement an environmental education program that would include education activities, curriculum development, and information dissemination through guest lectures, field trips, workshops, cooperative projects, and reading material.
- Develop cooperative partnerships with

concerned public land user groups, individuals, and private companies.

- Coordinate and train personnel within BLM to promote development and use of fisheries resources.
- Coordinate and train personnel within BLM to write grant proposals and administer grants.



Goal 7. Promote existing and potential recreational and other uses and economic benefits, while ensuring protection of all fishery resources.

Development and maintenance of recreation sites are budgeted within the Wildlife and Fisheries, Recreation Management, and Recreation Maintenance Programs. Close coordination among these programs is absolutely essential. In addition, interdisciplinary cooperation among all BLM programs (i.e. Range, Soil/Water/Air, Forestry, Minerals, etc.) is necessary to assure maintenance, protection, and enhancement of the fisheries habitat while providing public access.

Numerous types of recreation sites have been developed on BLM lands including: campgrounds, concessions, roads, fishing docks, interpretive signs, access stiles, access ramps, trails, viewing boxes, boat ramps, parking, day-use sites, and access for the physically challenged. However, many BLM fishing sites will remain "undeveloped" to accommodate more primitive recreational pursuits.

BLM currently maintains access at more than a dozen sites which promote recreational activities based on fishery resources. Among these sites, 7 have been identified for expansion or upgrade. In addition, 9 new areas could be developed during the next 10 years. Development, expansion, and maintenance of recreation sites will require approximately \$5,000,000.00. See Appendix B for a list of sites and maintenance and development/expansion costs.

Strategies

- Promote an understanding of

ecosystems, aquatic resource conservation, and angler ethics.

- Identify and develop new recreation sites to support the recreational fishing policy (USDA and USDI, 1988).
- Expand existing recreational sites to accommodate growing fishing demands.
- Maintain existing recreational use sites.
- In cooperation with partners, promote establishment of watchable wildlife sites incorporating resident fish resources.

The National Watchable Wildlife Program

The National Watchable Wildlife Program was developed due to a national interest in wildlife viewing and the need to develop new support for wildlife programs. This program establishes "Watchable Wildlife" areas jointly with government agencies and private groups to designate specific areas where fish, plants, or wildlife can be readily observed. The program is coordinated by Defenders of Wildlife.

Goal 8. Secure lands and waters important to improve manageability of or access to fishery habitats.

BLM's land ownership pattern is often scattered (i.e., "checkerboard") and may not be situated for the best management of fishery habitats. In some cases, private or other landowners may inhibit direct recreational or managerial access to BLM-administered public lands. In addition, waters and lands in non-federal ownership within specific watersheds may be managed for many uses, often with conflicting objectives, in ways which adversely affect fishery habitats on BLM lands.

The Bureau has many avenues to follow to assure proper management of fishery habitats on BLM-administered lands. The Bureau functions within mandated laws, regulations, and guidelines to foster multiple-use management which can protect and maintain fishery habitats. Individual state regulatory processes often can be used to enhance the management of watersheds to the benefit of waters on BLM lands (i.e., minimum instream flow requirements). BLM can initiate partnerships and cooperative agreements with other landowners and managers to foster the enhancement or maintenance of fishery habitats. With an active lands program, BLM can initiate exchanges, easements, donations, and acquisitions of lands and water to improve manageability of fishery habitats. Coordination with other federal, state, and local agencies is important to protect the rights and resources of private landowners.

The acquisition of land, water, and water rights, by whatever means, is projected to require at least \$19 million over the next 10 years. This includes proposed Land and Water Conservation Fund

acquisitions. In lieu of purchase, lands and waters can be secured through management partnerships, cooperative agreements, donations, exchanges, and easements.

Strategies

- Initiate partnerships or cooperative agreements to accommodate management of fishery resources.
- Identify and prioritize opportunities to secure lands, water, and access easements.
- Secure easements to public fishing waters.
- Secure lands necessary to facilitate ecosystem management.
- Secure lands necessary to provide access to public fishing waters.
- Secure sufficient water to provide quality habitat for fish and other aquatic species.



Goal 9. Ensure there are adequate personnel with appropriate qualifications to carry out and monitor the fisheries and regional ecosystem management programs.

An adequate number of qualified personnel is critical for successful management of fish and aquatic resources. Implementation of this strategy will require not only expertise in the sciences relating to the function of aquatic communities but also expertise for the interdisciplinary teams for the Watershed Analysis and the abilities to administer and oversee contracts.

Expertise in the field of aquatic communities is required for the identification of the fish and aquatic resources, the prioritization of these resources on a bioregional level, the fish and aquatic resources input for the Watershed Analysis procedure, and the ability to conduct public outreach and funding requests on behalf of the fish and aquatic resources. This expertise includes the following:

- Fish biology and ecology
- Aquatic biology and ecology
- Geomorphology
- Hydrology
- Plant ecology
- Soil science
- GIS
- Monitoring.

Because sound management for the fish and aquatic resources will depend on the Watershed Analysis and watershed-level ecosystem management approach, accomplishment of this more complex level of management will require additional expertise beyond just fish and aquatic resources:

- Forestry
- Wildlife
- Range Conservation
- Recreation
- Cultural resources
- Sociology
- Minerals
- Economics
- Technology
- Land use planning
- Agriculture
- Aquaculture
- Exotic Species Management
- Lands and realty
- ... (specialties for Watershed Analysis)

Coordinating and working with a diverse group of people, outreaching to the public, and managing contracts and external funds as funds become pooled to accomplish bioregional management will also require special skills and knowledge of the following:

- Public facilitation
- External funding mechanisms
- Environmental education
- Contracting

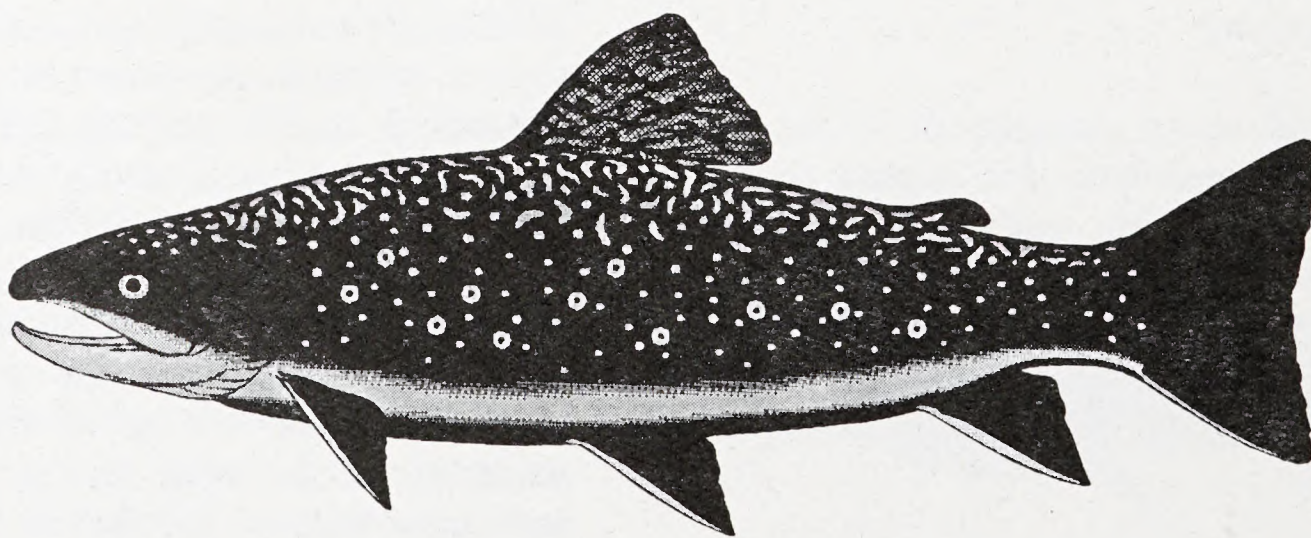
To continue promoting bioregional planning and ecosystem management, which in turn will benefit the fish and aquatic resources, there needs to be a strong advocate for ecosystem management, or an Ecosystem Management Sponsor.

Not all of the expertise needs to be within the BLM, but all of the expertise needs to be available for at least each aquatic province. Expertise can be found in

participants from other agencies and organizations, private consultants, universities, and other individuals and organizations.

Strategies

- Begin putting together lists of people who can participate in the bioregional planning and watershed analysis.
- Identify where expertise is lacking for an aquatic province and actively seek funding for a position with BLM or elsewhere to fill the need.
- Provide or promote training, attendance at professional workshops and meetings, and continued education to maintain a highly qualified team of professionals for each aquatic province for implementing the strategies in this document.
- Encourage cross-training to achieve better understanding among the professionals involved in the bioregional planning and watershed analysis steps of this plan.



Benefits and Conclusions

Implementation of this *Aquatic Ecosystem Strategy* will result in many benefits. The most important of these is to provide for healthy and productive populations of fish and other aquatic species through incorporation of ecosystem management concepts. Concerted efforts to preserve, restore, and improve habitats will protect our heritage of native species and natural ecosystems. This strategy strives to protect wild populations from the detrimental effects of genetic introgression or interspecific competition from nonnative species. This plan also provides goals and strategies for the management of fishery resources to be incorporated into all levels and types of activity plans.

A secondary benefit from maintaining healthy aquatic ecosystems is to provide public recreational fishing opportunities. This strategy recognizes the need for a partnership between fisheries and recreation managers. Emphasis is placed on recreational fishing access through easements and rights-of-way, and construction of docks, trails, boat ramps, and parking facilities. The placement of artificial habitats is coordinated with fishing sites to increase fishing success. Angler amenities built in association with access sites, such as restrooms and fish cleaning stations, also will serve the physically challenged.

Healthy aquatic resources on public lands also provide economic benefits. A Bureau of Census 1993 report, which is referenced on page three of this document, notes that the total expenditures for fishing in California (1991) was estimated at \$1.8 billion.

There are several other benefits from improving fishery habitats. Healthy fish populations require good quality water. Maintaining and improving water quality is mandated by the Clean Water Act. Meeting this requirement is facilitated by restoring and maintaining healthy riparian-wetland ecosystems. Properly functioning riparian-wetlands ecosystems benefit wildlife and other aquatic organisms, filter runoff, absorb energy from floodflows, provide desirable recreation sites, etc. Proper management of uplands in a watershed reduces siltation and nonpoint source pollution and ensures continued productivity.

Clearly, from a recreational, economic, biological, aesthetic, and ecosystem standpoint, implementation of this *Aquatic Ecosystem Strategy* will provide many benefits. It will also demonstrate how a partnership between government and non-government agencies and the private sector can meet common goals and objectives. Partnerships ensure that fishery resources on BLM-administered lands continue to provide an enduring source of sustenance and enjoyment for all who live in or visit California and a continuing flow of social and economic benefits to the Nation.

Table 10 summarizes the planned strategies and associated costs for the fisheries program excluding special status fishes habitat within the California Desert District (CDD). CDD special status fishes strategies and associated costs are detailed in the draft *Special Status Fishes Plan for California Desert District*.

Table 2.

Recommended strategies for fisheries habitat management and costs necessary for implementation.

Strategy	Units	Funding Needed (000s)
Inventory/Monitoring	Streams 4,700 miles	2,500
	Lakes/Reservoirs 4,300 acres	
Watershed/Ecosystem Activity Planning	Plans Needed 50	3,500
	Plans Revised 13	
	Plans Implemented 100	
Ecosystem Restoration and Aquatic/Riparian Habitat Protection	Proposed Projects 80	15,400
Outreach Projects and Partnership Agreements	Projects 60	800
	Agreements 45	
Maintain Current and Develop New Fishery Recreational Sites	Maintenance (Sites) 14	5,020
	Develop/Expand (Sites) 16	
Land Exchanges and Acquisitions	Water Rights 15	19,000
	Easements 15	
	Land Exchanges 25	
Research and Studies	Studies 25	1,600
Total		47,820

Appendix A

MEMORANDUM OF UNDERSTANDING

California's Coordinated Regional Strategy

To Conserve Biological Diversity

"The Agreement on Biological Diversity"

September 19, 1991

I. Preamble

California is one of the most biologically diverse areas in the world. The state's rich natural heritage--vegetation cover and distribution, wildlife and fish habitat, recreation and aesthetic values, water and air quality--provides the basis for California's economic strength and quality of life. Sustaining the diversity and condition of these natural ecosystems is a prerequisite for maintaining the state's prosperity.

Public agencies, private organizations, and individual citizens have long shared a commitment to conserving the natural environment of their state. Laws, policies, and programs already in place protect many elements of California's natural heritage. That experience, and a growing body of scientific research, demonstrate the need to move beyond existing efforts focused on the conservation of individual sites, species, and resources. Californians now recognize the need also to protect and manage ecosystems, biological communities, and landscapes.

These broader systems represent an important component of the state's biological diversity--the full variety of living organisms in California, the genetic differences among them, and the communities and ecosystems in which they occur. These ecological systems appear throughout the state across a variety of ownerships and jurisdictions. To effectively conserve California's biological resources and maintain social and economic viability, public agencies and private groups must coordinate resource management and environmental protection activities, emphasizing regional solutions to regional issues and needs.

II. Purpose

This Memorandum of Understanding establishes an Executive Council to develop guiding principles and policies, design a statewide strategy to conserve biological diversity, and coordinate implementation of this strategy through regional and local institutions.

III. Policy and Principles

This memorandum recognizes the following set of policies and principles.

A. The signatory parties agree to make the maintenance and enhancement of biological diversity a preeminent goal in their protection and management policies. Furthermore, they agree to work with the Executive Council to develop and adopt a coordinated regional strategy that ensures protection of biological diversity and the maintenance of economic viability throughout California.

B. The basic means of implementing the strategy are to be improved coordination, information exchange, conflict resolution, and collaboration among the signatory parties. In addition, the signatories agree to pursue the development of local and regional institutions and practices necessary to conserve biological diversity. These tools may include the establishment of mitigation and development banks, planning and zoning authorities, land and reserve acquisition, incentives, alternative land management practices, restoration, and fees and regulation.

C. Community and public support are vital to the success of a bioregional program. Human communities, local economies, and private property are important regional attributes to be maintained. As a consequence, signatories will develop procedures and guidelines to facilitate public education, dialogue and participation, and to minimize the disruption of human communities and expectations. Public lands are to be given first preference as reserves and conservation areas. Impacts on private lands will be minimized to the degree possible.

D. Biological diversity is to be viewed as an attribute of natural processes operating at the landscape, ecosystem, species, and genetic levels. These processes are dynamic varying over time and space. A recognition is made that these processes are altered by both human and natural factors. While the focus of the agreement is on biologic factors, abiotic elements are also recognized as important components of natural systems. The signatories agree to pursue the establishment of measurable baselines and standards of diversity as a means of conserving biological resources over time.

E. Given the changing characteristics of both the biological and social environment, the signatories agree to an adaptive approach in the development of bioregional strategies. Such an approach will place substantial emphasis on monitoring, assessment, and research programs. These programs will help determine if strategies are accomplishing their intended objectives, maximize the opportunities to learn from experience, and enhance flexibility in the face of new knowledge.

IV. Authority

This Memorandum does not modify or supersede existing statutory direction of the signatories.

V. Organization

A. Statewide Executive Council - The Executive Council is to be chaired by the Secretary of The Resources Agency of California and made up of the principal signatory agencies. The Council will set statewide goals for the protection of biological diversity, recommend consistent statewide standards and guidelines, encourage cooperative projects and sharing of resources, and cooperate in the following program areas:

1. Biodiversity-related policies and regulations;
2. Land management, land use planning, and land and reserve acquisition and exchange;
3. Private landowner assistance;

4. Educational outreach, public relations, and staff training;
5. Monitoring, inventory, and assessment;
6. Restoration; and
7. Research and technology development.

The Council will seek adequate funding to implement regional strategies and to develop necessary state and regional institutions, such as trading and mitigation banks. Further, the Council will cooperate with regional representatives to define the boundaries of bioregions and to help to establish Bioregional Councils.

The Council will meet quarterly to review progress in accomplishing its mission. Representatives of other state and federal agencies and sponsors will be invited to participate in the meetings of this group. The Council will produce and distribute to the public regular summaries of its activities.

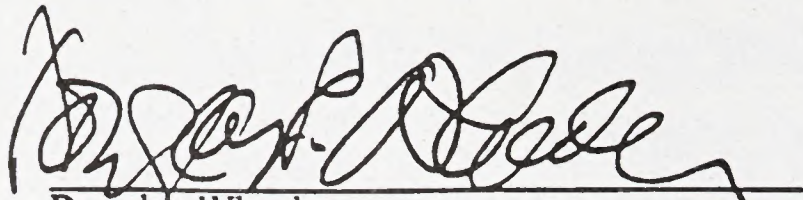
B. Sponsors - A sponsor may be any special interest group or organization that supports the purpose and intent of this Memorandum of Understanding. Sponsors will be expected to promote the development and adoption of biodiversity strategies and principles through their membership and activities. Sponsor representatives are to be invited to attend and participate in any Executive Council meeting or activity. Sponsorship should help enhance consensus and participation in the adoption of bioregional strategies.

C. Bioregional Councils - Regional administrators of signatory agencies will develop regional memoranda of understanding with the purpose of establishing Bioregional Councils. Participation of additional organizations specific to each region, such as county governments and local environmental and industry groups, will be encouraged. The Councils will develop regional biodiversity strategies that incorporate the policies, principles, and activities listed above under the mission of the Executive Council. Regional solutions to regional issues and needs will be encouraged, consistent with statewide goals and standards. The Councils are to work with regional and local authorities to implement biodiversity policies. In addition, Bioregional Councils will actively encourage the development of watershed or landscape associations to assist in implementing regional strategies.

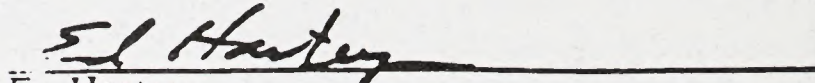
D. Watershed and Landscape Associations - Local staffs of signatory agencies will encourage the participation of local public, landowner, and private organizations in the formation of watershed or landscape associations. These associations will be encouraged to develop specific cooperative projects that help to achieve regional and statewide objectives. Use of Coordinate Resource Management Planning process will be encouraged. The local associations are to be a primary forum for the resolution of local issues and conflicts related to biodiversity concerns.

VII. Modifications

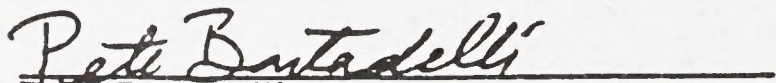
This agreement is to remain in effect until modification by the parties in writing; it is negotiable at the option of any one of the parties.



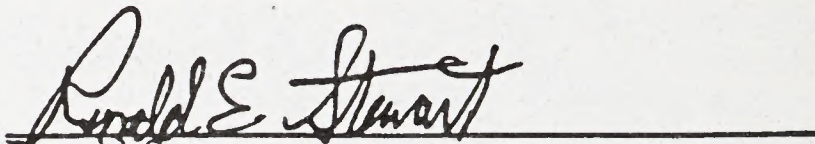
Douglas Wheeler
Secretary
The Resources Agency



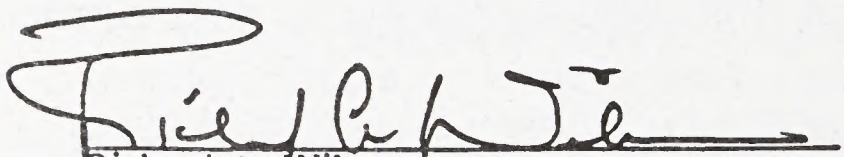
Ed Hastey
California State Director
USDI Bureau of Land Management



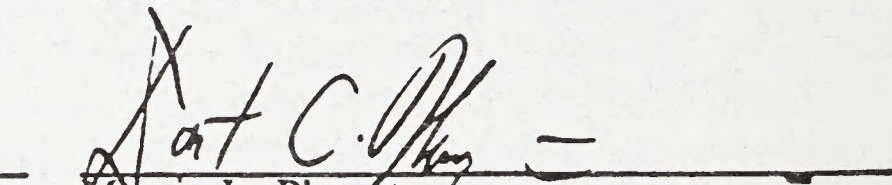
Peter Bontadelli
Director
California Department of
Fish and Game



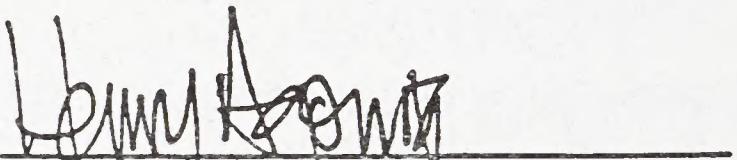
Ronald Stewart
Regional Forester
Pacific Southwest Region
USDA Forest Service



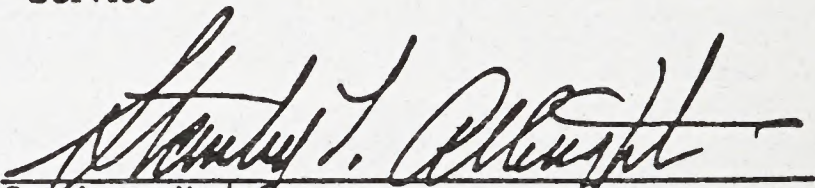
Richard A. Wilson
Director
California Department of Forestry
and Fire Protection



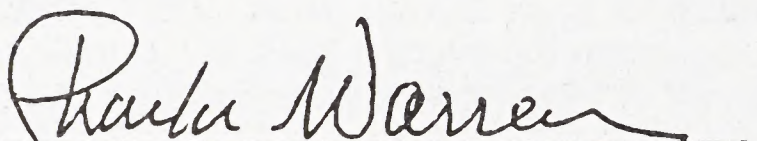
for Marvin L. Plenert
Regional Director
USDI U.S. Fish and Wildlife
Service



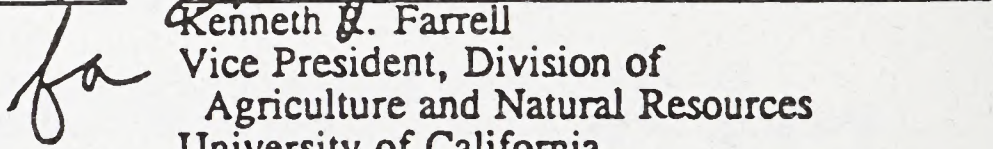
Henry Agonia
Director
California Department of Parks
and Recreation



Stanley Albright
Regional Director
Western Region
USDI National Park Service



Charles Warren
Executive Officer
State Lands Commission



Kenneth G. Farrell
Vice President, Division of
Agriculture and Natural Resources
University of California

Pearlie Reed

Pearlie Reed
State Conservationist
Soil Conservation Service
U.S. Department of Agriculture

8/11/92 *Henry Voss*

Henry Voss
Director
California Department of Food and Agriculture

John Smythe

John Smythe
State Executive Director
USDA Agricultural Stabilization and
Conservation Service

8/2/92

Roger Patterson

Roger Patterson
Mid-Pacific Regional Director
Bureau of Reclamation
U.S. Department of the Interior

8/12/92

Ed Heidig Aug 11, 1992

Ed Heidig
Director
California Department of Conservation

David Kennedy

David Kennedy
Director
California Department of Water Resources

8/13/92

Charles A. Pritchard 9/11/92

California Association of Resource Conservation
Districts

9/14/93

**STATEMENT OF INTENT
TO SUPPORT
THE AGREEMENT ON BIOLOGICAL DIVERSITY**

California Counties have long recognized the importance of maintaining productive, healthy natural resources and ecosystems which in turn provide the setting of lifestyles, scenery, recreation, and the diversity of natural life systems, while providing resources for raw materials to produce products, jobs, and community stability.

California Counties support the Agreement on Biological Diversity in the context of balanced and wise use of natural resources. To alleviate the difficult task of allocating uses of these resources, Counties support the idea of coordinated and cooperative planning efforts of multiple jurisdictions, species, and ecosystems. These efforts should be conducted with strong local leadership and the participation of everyone concerned with natural resource use and management and implemented consistent with existing local, state, and federal laws and regulations.

With the active participation of locally elected leaders, land managing agencies, and locally affected publics, we believe the Agreement can help conserve California's rich biological diversity for future generations to enjoy and promote responsible development as we strive to meet the future needs of California's citizens.

Nick W. Blom
San Joaquin Valley Regional
Association of County Supervisors

David R. Howard
North Coastal Counties
Supervisors Association

Mike Fluty
MIKE FLUTY, CHAIRMAN
Sacramento-Mother Lode
Regional Association
of County Supervisors

Patti Mattingly
Northern California
County Supervisors Association

Lawrence Parent
Southern California
Regional Association
of County Supervisors

Fred Keeley
Central Coast FRED KEELEY
Regional Association
of County Supervisors

Arthur B. Begg
Regional Council
of Rural County Supervisors

Lawrence Parent
South Central Coast
Regional Association

Approved:

John J. Woods
Chairman, Executive Council

11-13-92
(Date)

Appendix B Fisheries Recreation Sites

Water Body or Site Name	Annual Maintenance Costs (000s)	Development/Expansion Costs (000s)
Bare Creek Exclosure	5	30
Hobo Camp & Devil's Corral		75
Eagle Lake interpretive signs		10
Fitzhugh Creek		10
Pit River Campground		50
Horton Rock Creek	30	30
Merced River	110	50
North Fork Yuba	10	
Squaw Leap, San Joaquin	20	
South Fork Yuba	30	
Mokelumne	30	
North Fork American River	30	85
Kern River	15	
Kaweah Creek	5	50
Dave Moore Nature Area	5	
Keyville/Kern		100
South Fork Kaweah		80
Paynes Creek	10	100
Copco Lake	5	
Reading Island	60	100
Keswick, Sacramento River		200
Sacramento River Perry Riffle		200
Trinity River		200
Total Cost to the Year 2004	3,650	1,370
Total Costs of Maintenance and Development/Expansion to the Year 2004		\$5,020,000.

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